

CO-OPS Current Meter Reconnaissance Procedures

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Approved By: Chris Paternostro

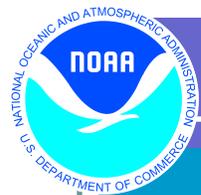
1. **Title:** CO-OPS Current Meter Reconnaissance Procedures
2. **Purpose:** In order to support the NOS and CO-OPS missions, new current meter stations are regularly required. The best method for assembling the information needed to deploy these stations is a reconnaissance. The primary objective of the reconnaissance is to determine the longitude, latitude, bottom type, depth, salinity-temperature profile, and any obstructions or issues at the proposed stations. The reconnaissance consists of personnel visiting the site sufficiently far in advance of site preparation to:
 - Locate an acceptable site.
 - Obtain measurements and information necessary to design the station.
 - Arrange for any permits/license agreements required.
 - Arrange for utilities (when needed for side-looking current meters).
 - Prepare a cost estimate and work schedule.
 - Allow time for the procurement and fabrication of special support components (if necessary).

The reconnaissance should be considered a project.

Background/History: A proper reconnaissance for current meter stations can be accomplished on a boat or on land (for side-looker deployments), taking bottom grab samples, CTD measurements, GPS measurements, fathometer readings, and video if available. If time allows, an ADCP tow can also be carried out to assess the water speeds over a tidal cycle in the area.

When applicable, property owners should be contacted in advance to obtain oral or written permission to use or modify the site; otherwise, a meeting with the property owner should be conducted as soon as site is visited. An advance letter of permission, permit, security clearance, or some other written instrument may be required by the owner. A license agreement may have to be executed before any work can be done.

Once the reconnaissance information is collected and a report issued, the proper mount type (or mooring configuration) and ADCP (type and frequency) is chosen, and a cost estimate and deployment schedule can be determined.



3. **Scope/Applicability:** This SOP is applicable for each new current survey conducted by NCOP, PORTS, COASTAL or OSTEP whether the work is completed in-house or through contract.

4. **Main Processes:**

1. Site Selection
2. Preparation
3. Equipment Required
4. Reconnaissance Notes

5. **Detailed Sub-Processes/Checklists:**

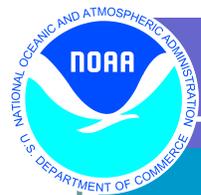
5.1 Site Selection

A current meter station is a stand alone station that is deployed on the ocean bottom, attached to a pier or structure for horizontal measurements, or a buoy (ATON) on the surface for downward measurements. The primary requirement of a station is to accurately measure current speed and direction that is representative of the area's flow with low power consumption, high reliability, and defined accuracy. The typical bottom mounted station includes a current meter housed in a trawl resistant bottom mount or subsurface float; an acoustic release; a transponding locator device; and either cable for mounting or line for recovery purposes. Side-looking equipment requires proper mounting to a fixed object utilizing a ladder or I-beam system to move the instrument from the surface to depth for deployment. Buoy mounted equipment requires a buoy designed to hold a particular instrument or an ATON buoy with a clamparatus designed to hold a Nortek AQP.

After a general region has been selected for the deployment of a current meter, the first step is to gather all relevant information. In many cases, the site is a previously occupied (historical) site and the latitude and longitude are known to a certain margin of error. In other cases, CO-OPS predetermines the latitude and longitude for the reconnaissance based on user requests or a "desktop" analysis of the area, and must make adjustments after the field reconnaissance either because of depth or other obstructions (see Desktop Reconnaissance Procedure for Planning Current Meter Deployments to Update the Tidal Current Tables).

Some office information that can be gathered prior to the reconnaissance is general chartlet information about the site, estimated speeds (taken from Coast Pilot or the Tidal Current Tables) and the bottom characteristics.

After the station locations have been identified and approved by the local users, visits each site by boat to collect station information about bottom type (utilizing a bottom grab), salinity (CTD cast), bottom depth (vessel fathometer), position (GPS fix), and information about ship support, staging areas, restricted zones where permits are



required, vessel traffic patterns, obstructions, shoaling patterns, etc. Photos and logs are completed during the recon.

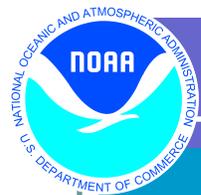
It is good to have an understanding of the weather or obstacles that you will encounter while on site and to make note of them on the logs.

5.2 Preparation

1. Based on the result of the desktop reconnaissance (SOP: Desktop Reconnaissance Procedure for Planning Current Meter Deployments to Update the Tidal Current Tables), develop a statement of work (SOW) for vessel procurement. This SOW should be prepared about 6 months before the vessel is utilized. The SOW should include: Background, Vessel requirements (*e.g.*, berths, crab block), Captain requirements, Number of stations, Period of performance, RFP information, and station location listing (name, latitude and longitude).
2. Using the size and location of the recon, determine the approximate cost for the vessel procurement and issue CRequest for vessel. This should be completed about 2.5 months before the vessel is utilized. Then review the bids using a Source Evaluation Board.
3. The project or field lead needs to perform a visual inspection of the vessel for safety. Check the following:
 - a. Up to date Coast Guard inspection – NOAA Form 75-91
 - b. Visual inspection to determine if the number of berths, knowledgeable captain, seaworthiness, crab block or wench are adequate, amenities necessary for work
4. Project lead will:
 - a. Determine the necessary crew for the recon. A well rounded crew will be comprised of, at the very least, a field tech and an oceanographer. Engineering expertise maybe beneficial for difficult deployment/recovery locations.
 - b. Plan a schedule for the crew's arrival, hotels, departure.
 - c. Contact the captain to determine the time frame on the water and the route needed to cover the chosen sites.
 - d. Plan to have the equipment prepared and shipped to the area needed for use during the recon.

5.3 Equipment Required

1. CTD (SOP: RBR CTD Setup and Data Retrieval), four CR123A Li (double check battery type) batteries, serial to telephone jack cable for communicating to the CTD
2. Van Veen bottom grab sampler or similar
3. 500 ft of line that matches the size of the crab block (for Alaska)
4. PFD (Float coats or vests)
5. Foul weather gear (jacket, pants, rubber boots)



6. Steel toed footwear when required
7. GPS with serial cable or USB GPS antenna
8. Printer
9. Computer with Nobletec, RBR Software and Windows Moviemaker, or similar video capture software
10. Digital camera
11. Underwater video camera
12. Reconnaissance logs
13. Cellular or Satellite phone
14. Two way radio
15. Power strip
16. Method to measure velocity (future)
17. Personal Locator Beacon

Optional Equipment

18. Books to read, videos to watch, cards
19. Motion sickness medicine or ginger

5.4 Reconnaissance Notes

The desktop recon will provide a general location of the deployment site. This field recon allows the opportunity to fine tune the placement. Rather short horizontal distances may allow large variability in the flow. Placement is key. After compiling all information possible in the office, it is time to visit the site. Upon arrival at the general location, proceed to the site determined from the office documents. *Use the Site Reconnaissance Field Notes form in Appendix A to record all information.*

The latitude and longitude will be recorded to 5 decimal places.

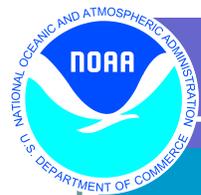
A depth sounding in meters will be recorded.

A bottom grab sample will be obtained to determine the bottom type for deciding what platform to use (is it soft mud, small pebbles, hard mud, large boulders, fine sand, etc?)

A CTD cast will determine salinity for the location in question, which will be used to configure the current meter profiling settings. The CTD can also be used to verify station depth, if the bottom is reached, and check the presence of a strong pycnocline.

Other information that is helpful to the successful deployment of the current meter should be noted, such as boat traffic, the wave climate or current observations.

Digital images should be taken of the bottom grab sample, buoys, nearby large ships or other defining landmarks. In addition, if the meter is side looking meter, photos of the pier and other structures shall be taken.



6. **Quality Assurance/Control:** Verify the station locations are safe from damage and that they don't detrimentally impact the environment by checking with the local pilots associations, fishing associations, harbor masters and vessel operators. Verify that each location has adequate depth that can be profiled by the selected ADCP.

7. **Management/Responsibility:** The Task Manager and Project Lead shall perform the site reconnaissance, if possible. Thorough notes are recorded on the reconnaissance log and a project plan will be developed based on the information gleaned from the site recon. This SOP is managed by CECAT.

8. **Appendix A: Site Reconnaissance Field Notes**
Complete the attached Reconnaissance Log for each station. Store the notes in a station summary sheet noting the details acquired during the reconnaissance.